



ADULT FOCUS IMMUNIZATIONS

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OBJECTIVES

- Identify important recent changes to the immunization schedules for adults in the U.S. and apply them to interactive patient cases.
- Describe new immunization recommendations for special groups such as HCP's, immunocompromised individuals, and pregnant women.
- Summarize information about the possible contraindications, precautions and adverse effects of select adult licensed vaccines.

POP QUIZ

During pregnancy, when should Tdap be administered?

1. Post-partum
2. During the second trimester
3. During the third trimester
4. Not be given if the woman has already had a dose of Tdap

POP QUIZ

Someone with a history of anaphylaxis to eggs should receive which of the following:

1. IIV3
2. LAIV4
3. RIV3
4. ccIIV3

POP QUIZ

Which of the following is a contraindication for the herpes zoster vaccine?

1. Immunosuppression
2. 1 month post chemotherapy
3. Oral steroid use (>20 mg/day of prednisone or equivalent, for >2 weeks)
4. Recent blood transfusion
5. 1, 2, and 3
6. All of the above

POP QUIZ

Who is at risk and therefore should receive a Hepatitis B vaccination?

1. 37 year old nurse with asthma
2. 59 year old contractor with diabetes
3. 45 year old librarian with high blood pressure
4. 35 year old injection-drug user

2014 Adult Immunization Schedule Changes

Recommended Adult Immunization Schedule United States - 2014

The 2014 ACIP Adult Immunization Schedule was approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), the American College of Obstetricians and Gynecologists (ACOG), and the American College of Nurse-Midwives (ACNM). On February 3, 2014, the adult immunization schedule and a summary of changes from 2013 were published in *Annals of Internal Medicine*, and a summary of changes was published in the *MMWR* on February 7, 2014.

All clinically significant postvaccination reactions should be reported to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

Additional details regarding ACIP recommendations for each of the vaccines listed in the schedule can be found at: <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>

American Academy of Family Physicians (AAFP)

<http://www.aafp.org/home.html>

American College of Physicians (ACP)

<http://www.acponline.org/>

American College of Obstetricians and Gynecologists (ACOG)

<http://www.acog.org/>

American College of Nurse-Midwives (ACNM)

<http://www.midwife.org/>



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

ADULT VACCINE FOOTNOTE CHANGES

- Hib in adults with HIV no longer recommended
- RIV3 can be used for all egg allergic people
- Tdap x1 for everyone 11 years and older
- HPV and HZ not specifically indicated for HCP's
- PCV13 before PPSV23 in adults
- MCV/MPSV4 clarification of 1 verse 2 doses and conjugate verse polysaccharide



SPECIAL POPULATIONS

- Pregnant Women
 - Immunocompromised Persons
 - Health Care Professionals
-

PREGNANCY

Vaccine	Before pregnancy	During pregnancy	After pregnancy	Type of Vaccine
Hepatitis A	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Hepatitis B	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Human Papillomavirus (HPV)	Yes, if indicated, through 26 years of age	No, under study	Yes, if indicated, through 26 years of age	Inactivated
Influenza IV	Yes	Yes	Yes	Inactivated
Influenza LAIV	Yes, if less than 50 years of age and healthy; avoid conception for 4 weeks	No	Yes, if less than 50 years of age and healthy; avoid conception for 4 weeks	Live
MMR	Yes, if indicated, avoid conception for 4 weeks	No	Yes, if indicated, give immediately postpartum if susceptible to rubella	Live
Meningococcal: • polysaccharide • conjugate	If indicated	If indicated	If indicated	Inactivated Inactivated
Pneumococcal Polysaccharide	If indicated	If indicated	If indicated	Inactivated
Tdap	Yes, if indicated	Yes, vaccinate during each pregnancy ideally between 27 and 36 weeks of gestation	Yes, immediately postpartum, if not received previously	Toxoid/ inactivated
Tetanus/Diphtheria Td	Yes, if indicated	Yes, if indicated, Tdap preferred	Yes, if indicated	Toxoid
Varicella	Yes, if indicated, avoid conception for 4 weeks	No	Yes, if indicated, give immediately postpartum if susceptible	Live

IMMUNOSUPPRESSED

DISEASE:

- Persons with congenital immunodeficiency should **NOT** receive live vaccines
 - *Leukemia, lymphoma, or generalized malignancy*

DRUGS:

- The safety and efficacy of live attenuated vaccines administered concurrently with **recombinant human immune mediators** and **immune modulators** are not known
- Avoid administration of live vaccines for at least a month following treatment with these drugs **or** administer the vaccine no less than 14 days before starting the therapy.

IMMUNOSUPPRESSED

DRUGS: (continued)

- Persons taking drugs causing immunosuppression should **NOT** be given live vaccines
- Live vaccines can be given after **chemotherapy** has been discontinued for at least 3 months
- Persons receiving large doses of **corticosteroids** should not receive live vaccines. Live vaccines can be given 1 month after discontinuation.
- If possible give vaccine 14 days prior to therapy

IMMUNOSUPPRESSED

GLUCOCORTICOID	APPROXIMATE EQUIVALENT DOSE (MG)	LENGTH OF ACTION
Cortisone	25mg	Short Acting
Hydrocortisone	20mg	
Methylprednisolone	4mg	Intermediate Acting
Prednisolone	5mg	
Prednisone	5mg	
Triamcinolone	4mg	
Betamethasone	0.6-0.75mg	Long Acting
Dexamethasone	0.75mg	

HEALTH CARE PROFESSIONALS

Vaccine	Recommendations in brief
Hepatitis B	Give 3-dose series (dose #1 now, #2 in 1 month, #3 approximately 5 months after #2). Give IM. Obtain anti-HBs serologic testing 1–2 months after dose #3.
Influenza	Give 1 dose of influenza vaccine annually. Give inactivated injectable vaccine intramuscularly or live attenuated influenza vaccine (LAIV) intranasally.
MMR	For healthcare personnel (HCP) born in 1957 or later without serologic evidence of immunity or prior vaccination, give 2 doses of MMR, 4 weeks apart. For HCP born prior to 1957, see below. Give SC.
Varicella (chickenpox)	For HCP who have no serologic proof of immunity, prior vaccination, or history of varicella disease, give 2 doses of varicella vaccine, 4 weeks apart. Give SC.
Tetanus, diphtheria, pertussis	Give a dose of Tdap as soon as feasible to all HCP who have not received Tdap previously and to pregnant HCP with each pregnancy (see below). Give Td boosters every 10 years thereafter. Give IM.
Meningococcal	Give 1 dose to microbiologists who are routinely exposed to isolates of <i>N. meningitidis</i> and boost every 5 years if risk continues. Give MCV4 IM; if necessary to use MPSV4, give SC.



CONTRAINDICATIONS, PRECAUTIONS & ADVERSE REACTIONS

CONTRAINDICATIONS & PRECAUTIONS

- Contraindications and precautions to vaccination generally dictate circumstances when vaccines will not be given
- **Contraindication**: A condition in a recipient that increases the chance of a serious adverse reaction
- **Precaution**: A condition in a recipient that might increase the chance or severity of an adverse reaction, or compromise the ability of the vaccine to produce immunity

CONTRAINDICATIONS

Permanent Contraindications:

- Severe (**anaphylactic**) allergic reaction to a vaccine component or following a prior dose of a vaccine
- **Encephalopathy** not due to another identifiable cause occurring within 7 days of Pertussis vaccination
- **SCID**= Severe combined immunodeficiency
- History of **intussusception** as contraindications to rotavirus vaccine.

Temporary Contraindications & Precautions

Temporary contraindications to vaccination:

- **Live vaccines:** pregnancy and immunosuppression

Temporary precautions to vaccination:

- **All vaccines:** Moderate or severe acute illness
- **Live vaccines:** Receipt of an antibody-containing blood product
 - Applies only to MMR and varicella-containing (except zoster) vaccines

VACCINE EXCIPIENTS

Vaccine	Contains
Hib/Hep B (Comvax)	yeast (vaccine contains no detectable yeast DNA), nicotinamide adenine dinucleotide, hemin chloride, soy peptone, dextrose, mineral salts, amino acids, formaldehyde, potassium aluminum sulfate, amorphous aluminum hydroxyphosphate sulfate, sodium borate
Hep A (Havrix)	aluminum hydroxide, amino acid supplement, polysorbate 20, formalin, neomycin sulfate, MRC-5 cellular proteins
Hep A (Vaqta)	amorphous aluminum hydroxyphosphate sulfate, bovine albumin, formaldehyde, neomycin, sodium borate, MRC-5 (human diploid) cells
Hep B (Engerix-B)	aluminum hydroxide, yeast protein, phosphate buffers.
Hep B (Recombivax)	yeast protein, soy peptone, dextrose, amino acids, mineral salts, potassium aluminum sulfate, amorphous aluminum hydroxyphosphate sulfate, formaldehyde.
Hep A/Hep B (Twinrix)	formalin, yeast protein, aluminum phosphate, aluminum hydroxide, amino acids, phosphate buffer, polysorbate 20, neomycin sulfate, MRC-5 human diploid cells
Human Papillomavirus (HPV) (Cerverix)	vitamins, amino acids, lipids, mineral salts, aluminum hydroxide, sodium dihydrogen phosphate dehydrate, insect cell and viral protein..

ALLERGIES

- **Egg protein:** The most common animal protein allergen
 - Ordinarily, a person who can eat eggs or egg products can receive vaccines that contain egg
 - Vaccine concerns: Influenza and Yellow Fever Vaccine
- **Certain vaccines contain trace amounts of neomycin & gelatin**
 - Persons who have experienced an anaphylactic reaction to gelatin or neomycin should not receive these vaccines.
 - Vaccine concerns: MMR, Varicella, Zoster, FluMist

ALLERGIES

Natural rubber latex is used to produce medical gloves, and is used in syringe plungers, and vial stoppers.

- The most common type of latex sensitivity is contact-type allergy (not a contraindication)
- Allergic reactions (including anaphylaxis) after vaccination procedures are rare.
- If a person reports a severe (anaphylactic) allergy to latex, vaccines supplied in vials or syringes that contain natural rubber should **NOT** be administered

Vaccine Excipient & Media Summary Excipients Included In U.S. Vaccines, by Vaccine

This table includes not only vaccine ingredients (e.g., adjuvants and preservatives), but also substances used during the manufacturing process, including vaccine-production media, that are removed from the final product and present only in trace quantities. In addition to the substances listed, most vaccines contain Sodium Chloride (table salt).

Last Updated February 2012

All reasonable efforts have been made to ensure the accuracy of this information, but manufacturers may change product contents before that information is reflected here. If in doubt, check the manufacturer's package insert.

Vaccine	Contains	Source: Manufacturer's P.I. Dated
Adenovirus	sucrose, D-mannose, D-fructose, dextrose, potassium phosphate, polysorbate C, anhydrous lactose, micro-crystalline cellulose, polacrilin potassium, magnesium stearate, cellulose acetate phthalate, alcohol, acetone, castor oil, FD&C Yellow #6 aluminum lake dye, human serum albumin, fetal bovine serum, sodium bicarbonate, human-diploid fibroblast cell cultures (WI-38), Dulbecco's Modified Eagle's Medium	March, 2011
Anthrax (Biothrax)	aluminum hydroxide, benzethonium chloride, formaldehyde, amino acids, vitamins, inorganic salts and sugars	December, 2008
BCG (Tice)	glycerin, asparagine, citric acid, potassium phosphate, magnesium sulfate, iron ammonium citrate, lactose	February, 2009
DT (Sanofi)	aluminum potassium sulfate, peptone, bovine extract, formaldehyde, thimerosal (trace), modified Mueller and Miller medium	December, 2005
DTaP (Daptacel)	aluminum phosphate, formaldehyde, glutaraldehyde, 2-Phenoxyethanol, Stainer-Scholte medium, modified Mueller's growth medium, modified Mueller-Miller caseamino acid medium (without beef heart infusion)	July, 2011
DTaP (Infanrix)	formaldehyde, glutaraldehyde, aluminum hydroxide, polysorbate 80, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium	November, 2011
DTaP (Tripedia)	sodium phosphate, peptone, bovine extract (U.S. sourced), formaldehyde, ammonium sulfate, , aluminum potassium sulfate, thimerosal (trace), gelatin, polysorbate 80 (Tween 80), modified Mueller and Miller medium, modified Stainer-Scholte medium	December, 2005
DTaP-IPV (Kinrix)	formaldehyde, glutaraldehyde, aluminum hydroxide, Vero (monkey kidney) cells, calf serum, lactalbumin hydrolysate, polysorbate 80, neomycin sulfate, polymyxin B, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium	November, 2011
DTaP-HepB-IPV (Pediarix)	formaldehyde, glutaraldehyde, aluminum hydroxide, aluminum phosphate, lactalbumin hydrolysate, polysorbate 80, neomycin sulfate, polymyxin B, yeast protein, calf serum, Fenton medium (containing bovine extract), modified Latham medium (derived from bovine casein), modified Stainer-Scholte liquid medium, Vero (monkey kidney) cells	November, 2011

MMR (MMR-II)	vitamins, amino acids, fetal bovine serum, sucrose, sodium phosphate, glutamate, recombinant human albumin, neomycin, sorbitol, hydrolyzed gelatin, chick embryo cell culture, WI-38 human diploid lung fibroblasts	December, 2010
Zoster (Shingles – Zostavax)	sucrose, hydrolyzed porcine gelatin, monosodium L-glutamate, sodium phosphate dibasic, potassium phosphate monobasic, neomycin, potassium chloride, residual components of MRC-5 cells including DNA and protein, bovine calf serum	June, 2011

Latex in Vaccine Packaging

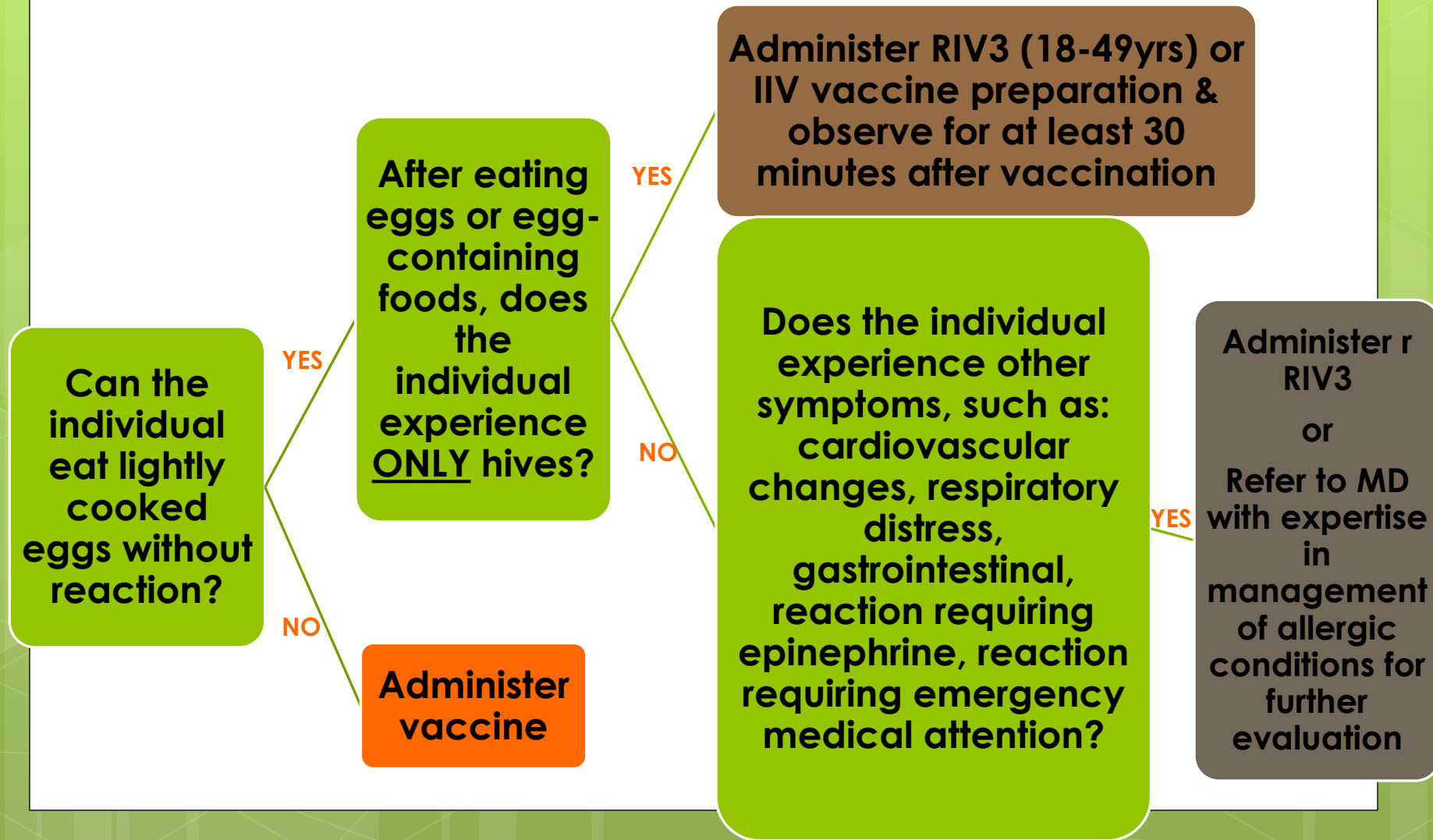
"If a person reports a severe (anaphylactic) allergy to latex, vaccines supplied in vials or syringes that contain natural rubber should not be administered unless the benefit of vaccination outweighs the risk for a potential allergic reaction. In these cases, providers should be prepared to treat patients who are having an allergic reaction. For latex allergies other than anaphylactic allergies (e.g., a history of contact allergy to latex gloves), vaccines supplied in vials or syringes that contain dry natural rubber or rubber latex may be administered." (ACIP General Recommendations on Immunization, 2011)

The following table is accurate, to the best of our knowledge, as of February 2012. If in doubt, check the package insert for the vaccine in question.

Vaccine		Latex?
Anthrax (BioThrax)		YES – Vial
Convax		YES – Vial
DTaP	Daptacel	NO
	Infanrix	YES – Syringe
	Tripedia	NO – Vial
DT (Generic)		YES – Vial
Hib	Hiberix	YES – Syringe Tip Cap
	PedvaxHIB	YES – Vial
	ActHIB	YES – Diluent vial NO – Lyophilized vaccine vial
Hepatitis A	Havrix	YES – Syringe
	Vaqta	NO – Vial
Hepatitis B	Engerix-B	YES – Vial
	Recombivax HB	YES – Syringe
	Recombivax HB	NO – Vial
HPV	Gardasil	YES – Vial
	Cervarix	YES – Syringe
Influenza	Fluarix	NO – Vial
	Fluvirin	YES – Syringe Tip Cap
	Fluzone	YES – Syringe Tip Cap
	Fluzone High-Dose	YES – Syringe Tip Cap
	Fluzone Intradermal	YES – Syringe
	FluLaval	NO
	Afluria	NO
	Agriflu	YES – Syringe Tip Cap
	FluMist	NO
Japanese Encephalitis (Ixiaro)		NO
Kinrix		YES – Syringe
MMR (M-M-R II)		NO – Vial
MMRV (ProQuad)		NO
Measles (Attenuvax)		NO
Mumps (Mumpsvax)		NO

Vaccine		Latex?
Rubella (Meruvax II)		NO
Meningococcal	Menomune	YES – Vial
	Menactra	YES – Vial
	Menveo	NO – Syringe
Pediarix		YES – Syringe
Pentacel		NO – Vial
Pneumococcal	Pneumovax 23	NO
	Prevnar 13	NO
Polio (IPOL)		YES – Syringe
Rabies	Imovax Rabies	NO – Vial
	RabAvert	NO
Rotavirus	RotaTeq	NO
	Rotarix	YES – Applicator
Td	Decavac	NO – Vial & Transfer Adapter
	Tenivac	YES – Syringe
	Generic	NO – Vial
	Generic	YES – Syringe
	Generic	YES – Syringe
Tdap	Adacel	YES – Syringe Tip Cap
	Boostrix	NO – Vial
TdHIBit		YES – Syringe
Twiarix		NO – Vial
Typhoid	Typhim Vi	NO
	Vivotif Berna	N/A
Varicella (Varivax)		NO
Vaccinia (Smallpox) (ACAM2000)		NO
Yellow Fever (YF-Vax)		YES – Vial
Zoster (Shingles) (Zostavax)		NO

EGG ALLERGIES



ANTIVIRALS & INFLUENZA

- Administration of IIV to persons receiving influenza antiviral drugs for treatment or chemoprophylaxis is acceptable.
- LAIV should not be administered until 48 hours after cessation of influenza antiviral therapy.
 - *If influenza antiviral medications are administered within 2 weeks after receipt of LAIV, the vaccine dose should be repeated 48 or more hours after the last dose of antiviral medication.*
 - *Persons receiving antiviral drugs within the period 2 days before to 14 days after vaccination with LAIV should be revaccinated at a later date with any approved vaccine formulation.*

ANTIVIRALS & VARICELLA

Precaution:

- Recent receipt of antiviral treatment 24 hours prior to vaccine and 14 days post vaccination
 - *Acyclovir*
 - *Famciclovir*
 - *Valacyclovir*



PATIENT CASES

CASE 1

- M.S. -Age 30
- Refer to handouts for case

CASE 2

- E.S. Age 70
- Refer to handouts for case

CASE 3

- S.J. Age 25
- Refer to handouts for case